

# Seabirds in a rapidly changing Beringia

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# *Quyanaq and Igamsi!*

## We work in the lands & waters of

Iñupiat, Siberian Yupik, and Yupik peoples (Bering Strait Region)  
Yup'ik, Alutiiq, Aleut (Bering Sea & Aleutian Islands)

Quyana to our funders and partners



Environment  
Canada



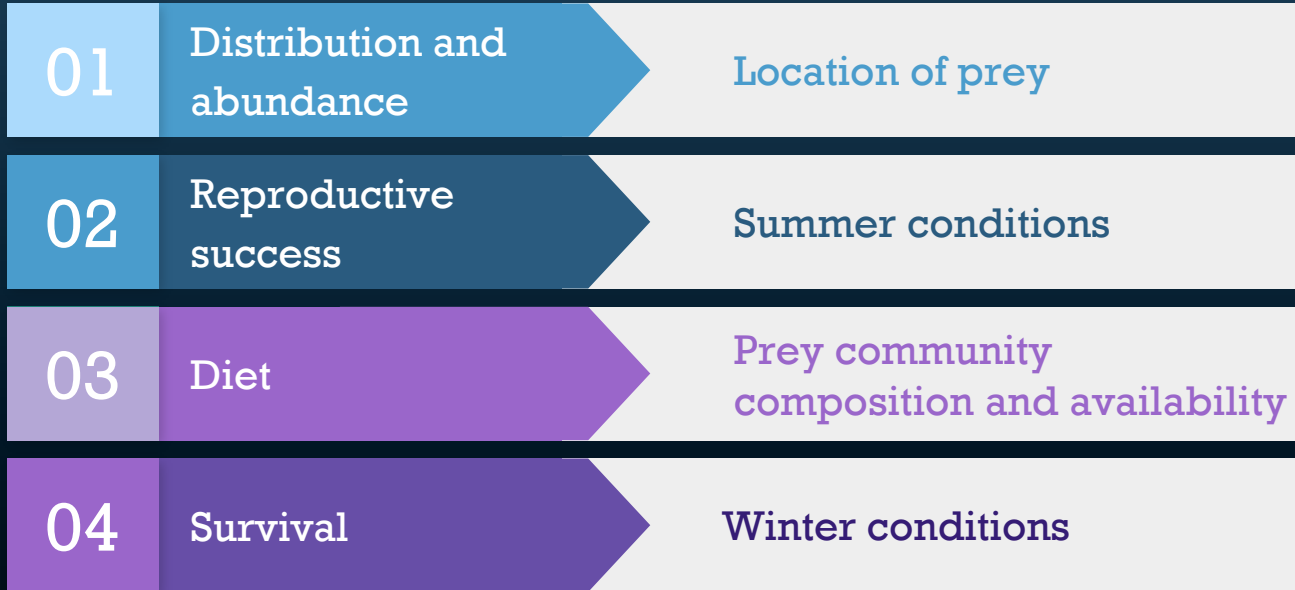
~ 30 million seabirds breed in Alaska

+

~30 million birds migrate here in summer

**What are seabirds telling us?**

# Seabirds as indicators



# Primary prey of seabirds in Beringia

**Euphausiids  
(Thysanoessa spp.)**



**Copepods  
(and other zooplankton)**



**Capelin**



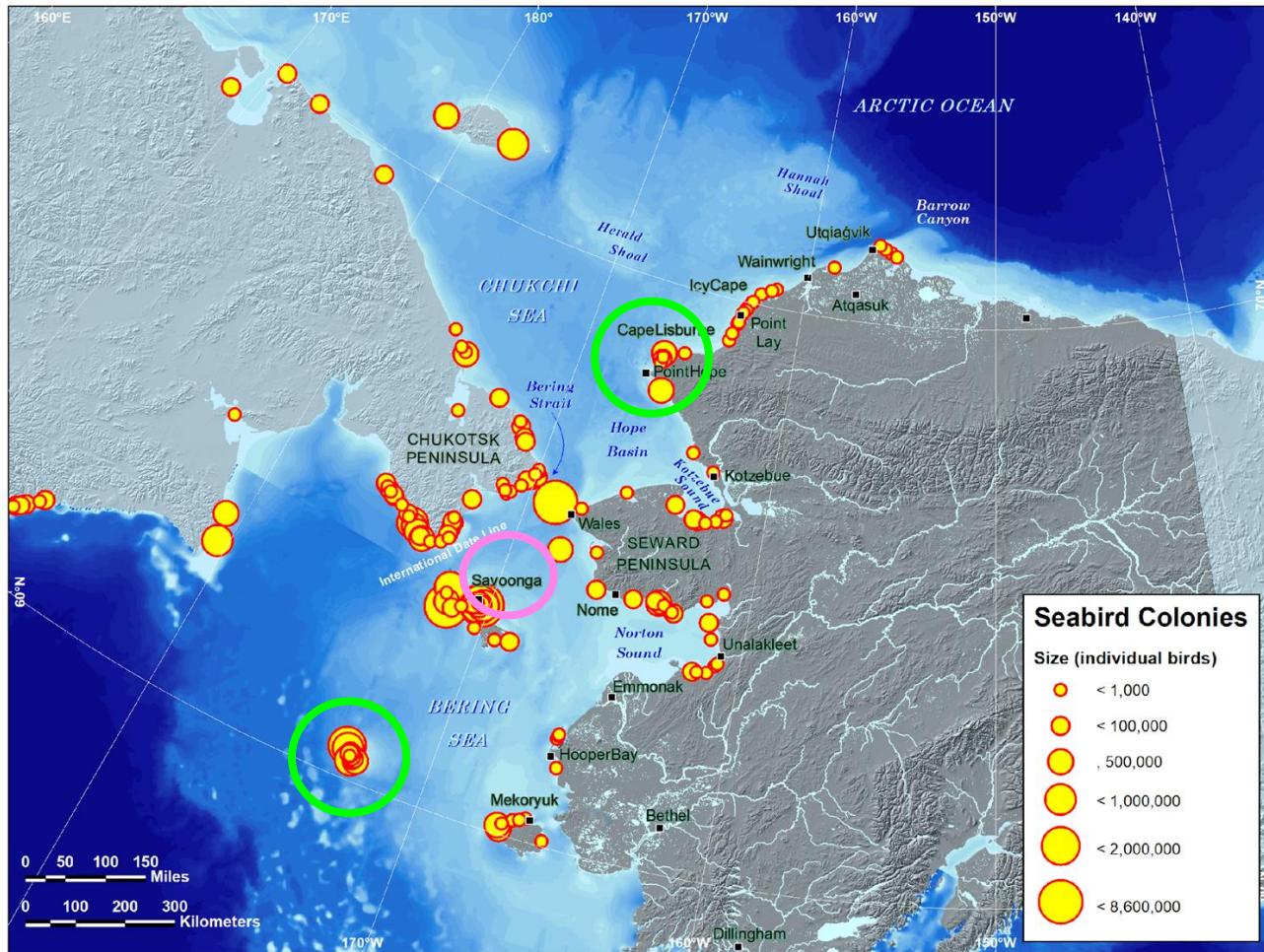
**Pacific Sandlance**



**Juvenile Walleye Pollock**



**Juvenile Arctic cod**



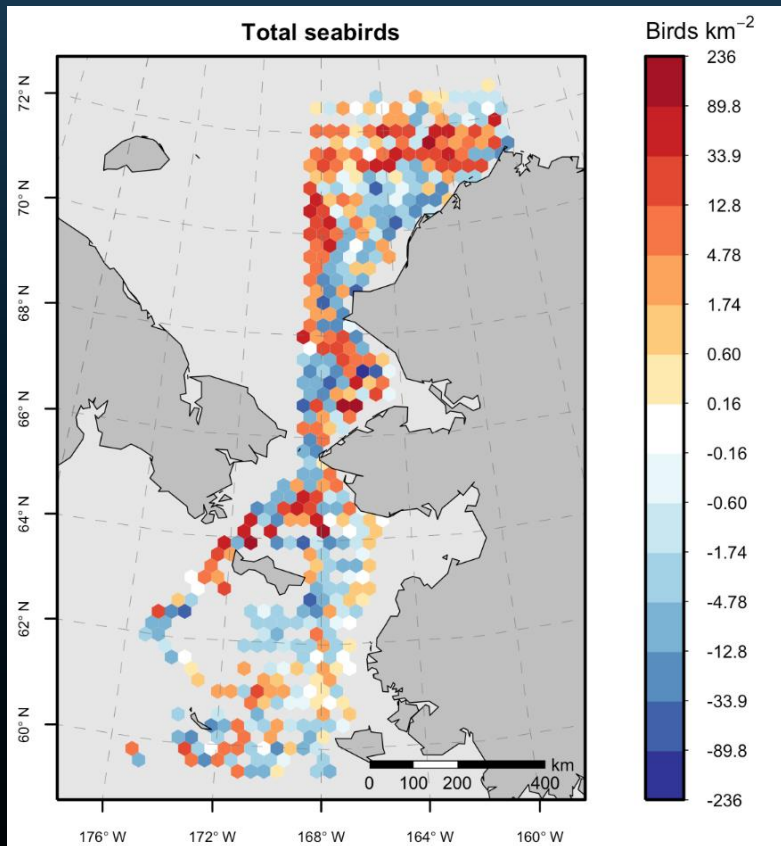
Monitored by  
USFWS

Monitored by  
grants (UAF, WWF)

# Changes in abundance at-sea during the heatwave

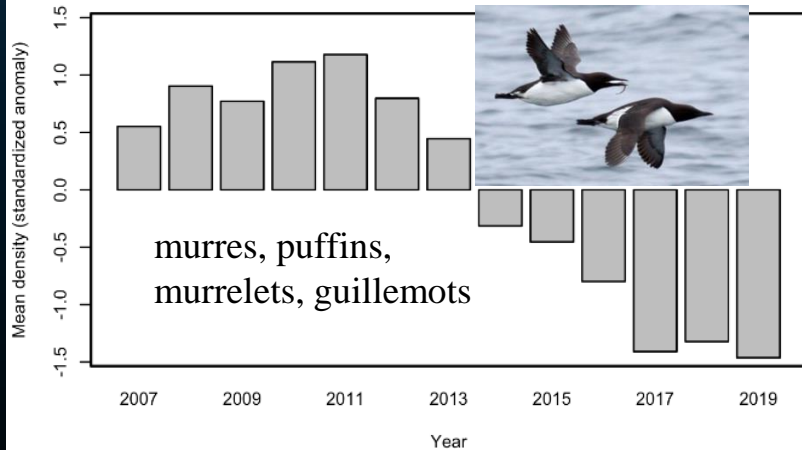
Total seabirds  
2017-2019 vs. 2007-2016

↑ in Chukchi offshore  
↓ in Alaska Coastal Water

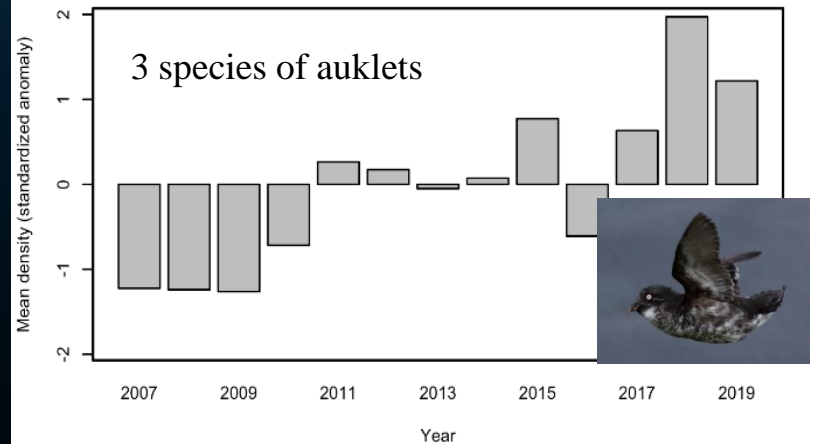


## Some changes in abundance & distribution appeared to start ~2014/2015

### Northern Bering Sea – Fish eaters



### Northern Bering Sea – Plankton eaters

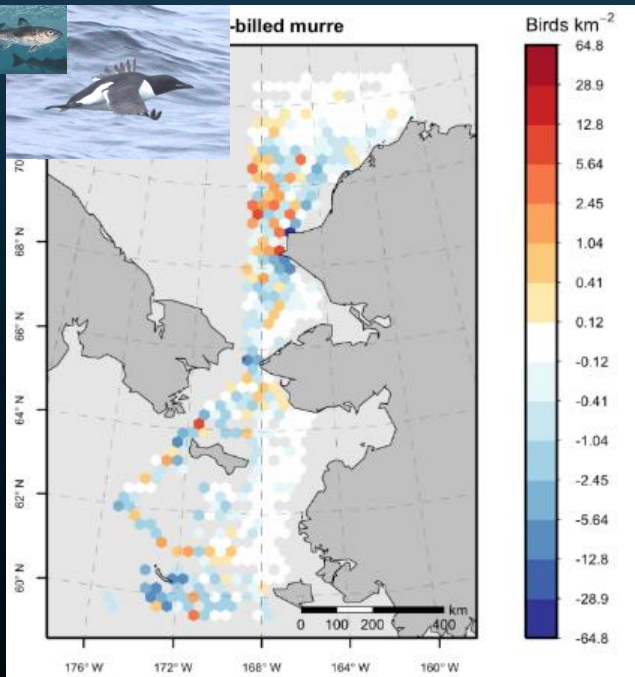




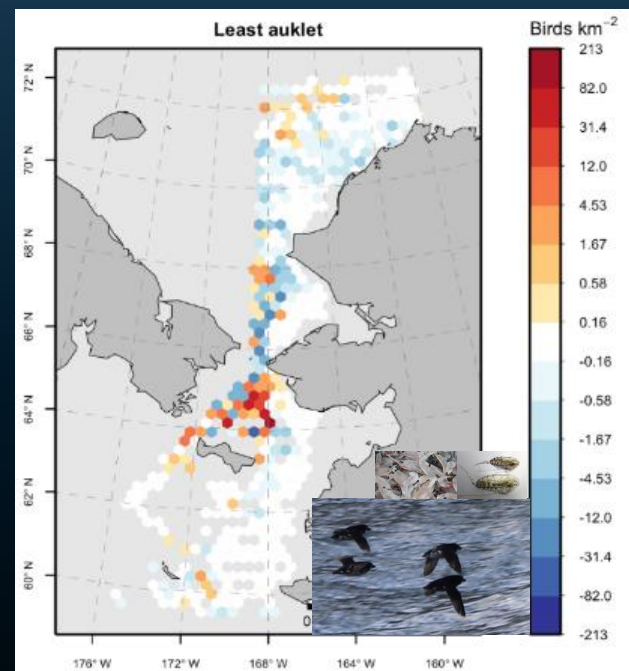
# Changes in distribution 2017-2019 vs 2007-2016



Thick-billed Murres



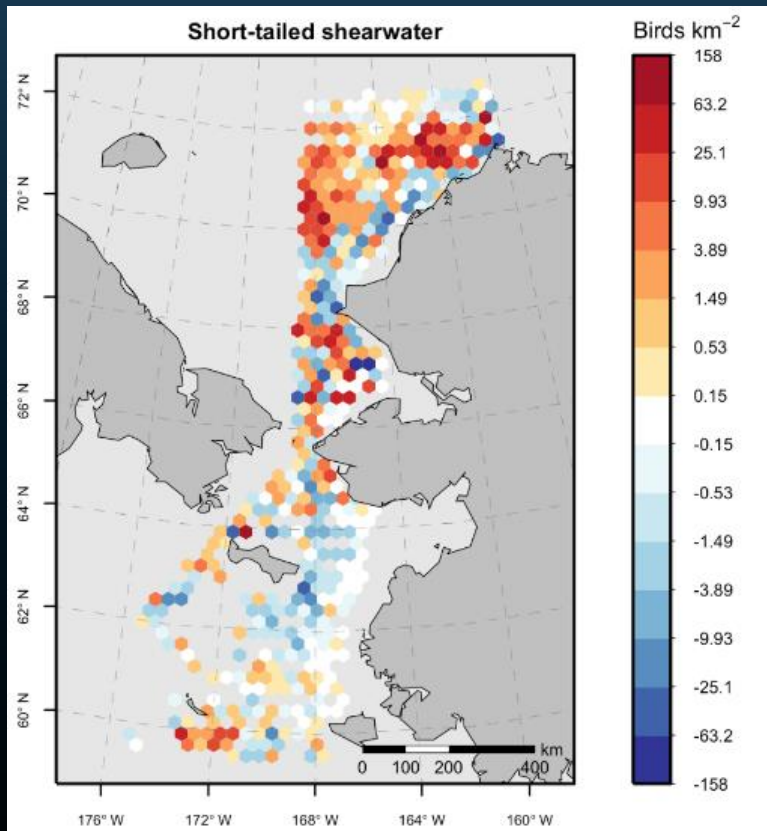
↑ in Chukchi  
↓ in Northern Bering



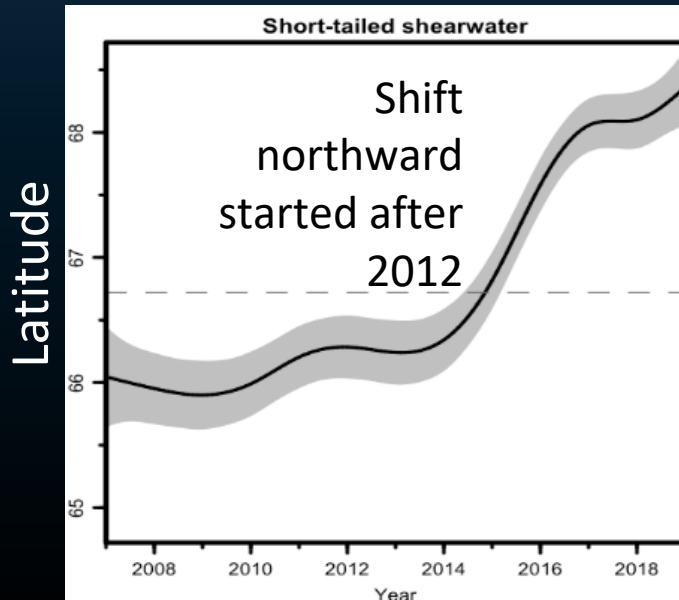
Least Auklets

↓ in Chukchi  
↑ in Northern Bering

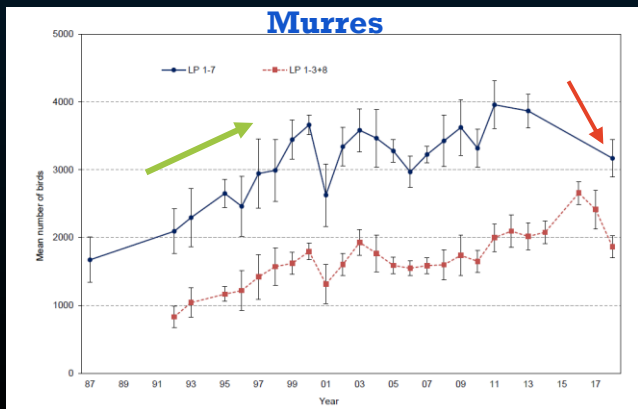
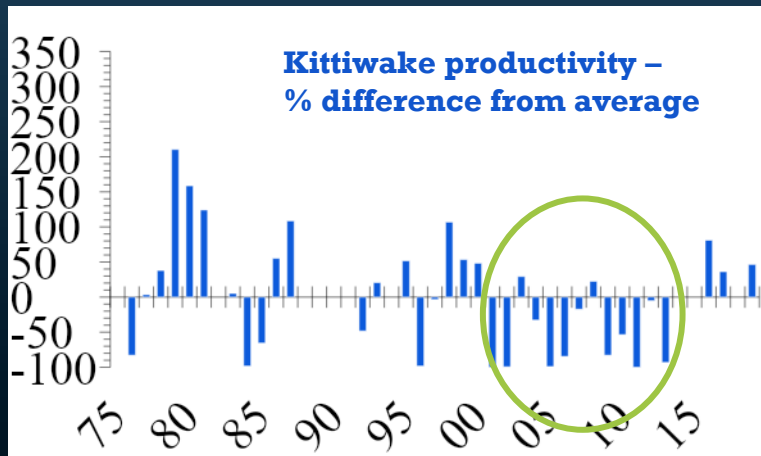
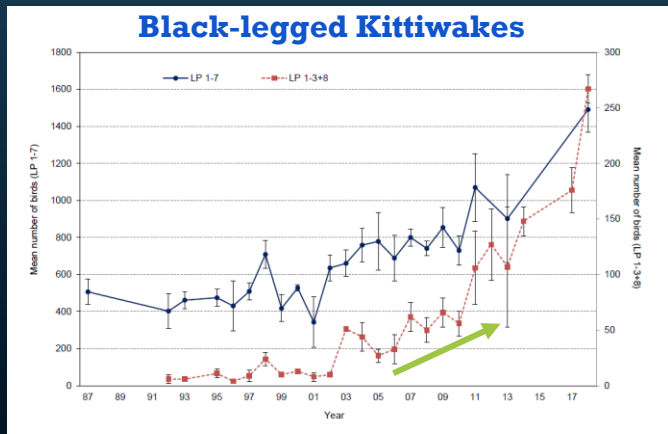
# Changes in distribution 2017-2019 vs 2007-2016




↑ in Chukchi  
↓ in Northern Bering



# Kittiwake & murre colonies growing at Cape Lisburne



Colony  even when productivity was low.  
Growing + 4-6% per year!

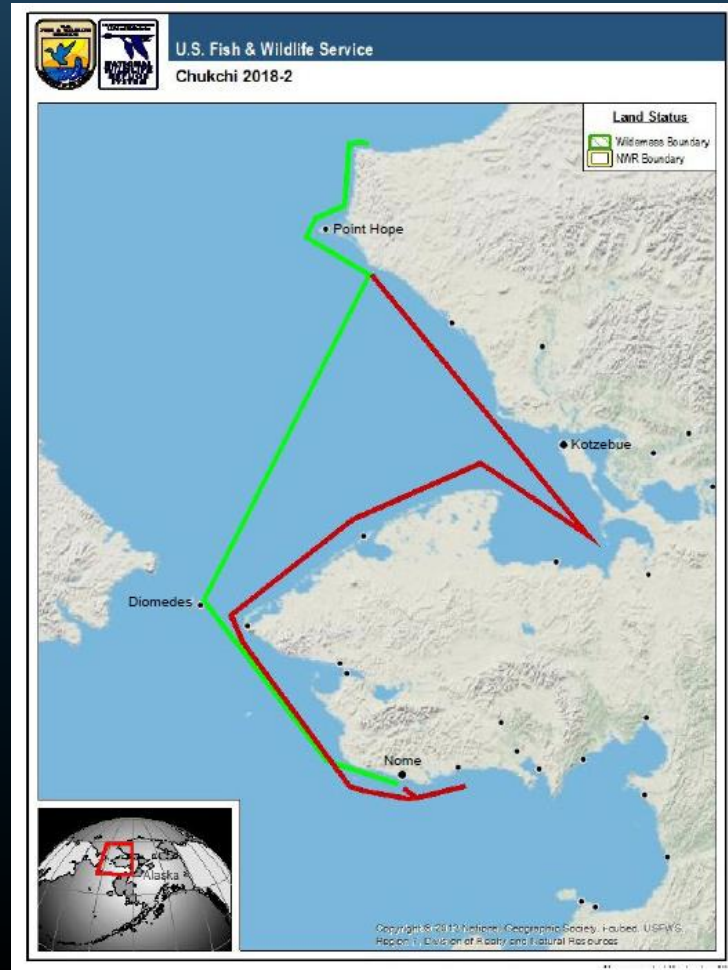
**Suggests immigration from the south**

(no productivity data for murres)

- Cape Lisburne surveyed ~annually from land
- First visit to Cape Thompson since 1995






## USFWS route on the Tiglax 2018



# Reproductive failures at colonies during the heatwave

Colony	Murres	Kittiwakes	Cormorants	Auklets
Cape Lisburne	☹️	?	?	Not present
Cape Thompson	🥚	🥚	Few noted	Not present
Cape Lewis	🥚	🥚	?	Not present
Puffin/Chamisso	☹️	?	?	Not present
Sledge	☹️	☹️	😊	Not present
Bluff	☹️	☹️	😊	Not present
St. Matthew	?	?	?	?
Nunivak	🥚	🥚	?	Not present
St. Paul	☹️	🥚	😊	☹️
St. George	☹️	🥚	😊	☹️

 Zero production  
  Low production  
  Average to high production

## Changes in N. Bering 2016-2019

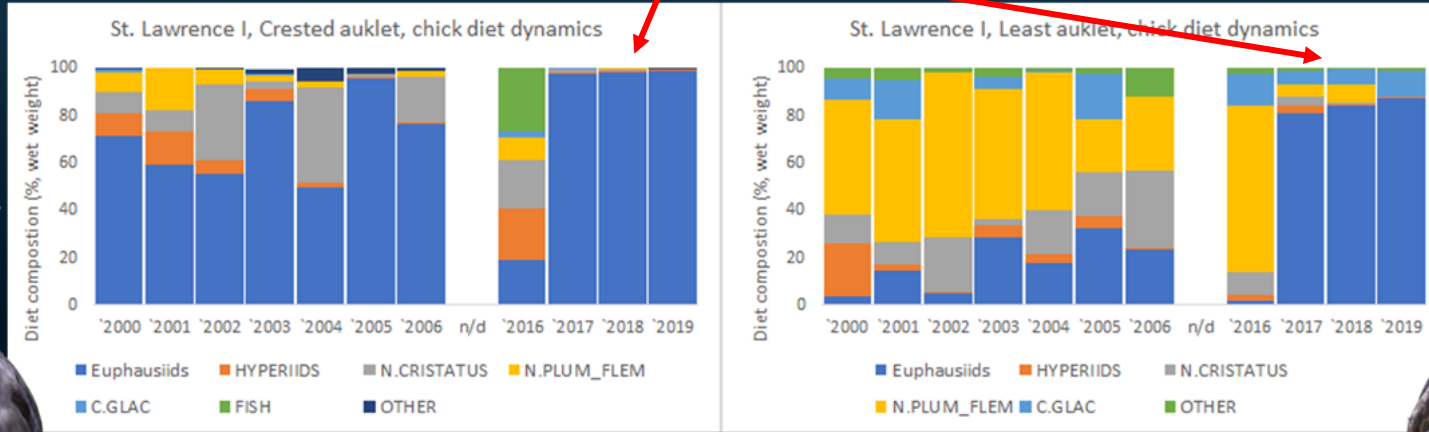
- not beneficial to breeding piscivores
- detrimental to planktivores

*Will et al., Romano et al. 2020  
Deep-Sea Research Part II*



Colonies visited by  
Alaska Maritime National Wildlife Refuge  
2018

# With increased water temperature...

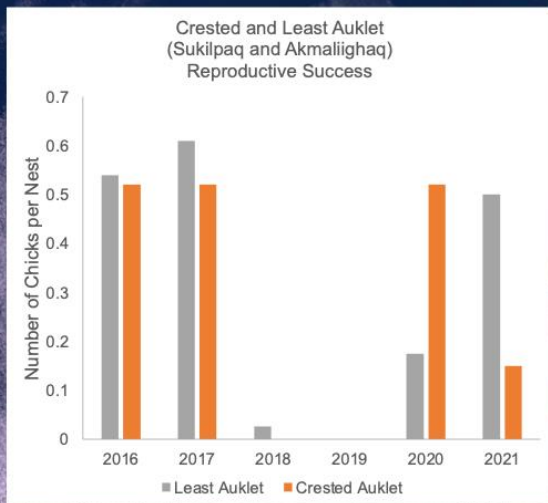


Pattern appears to have continued in 2020 and 2021.

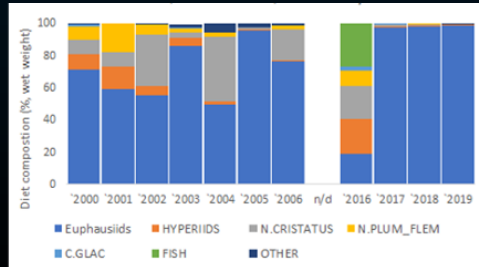
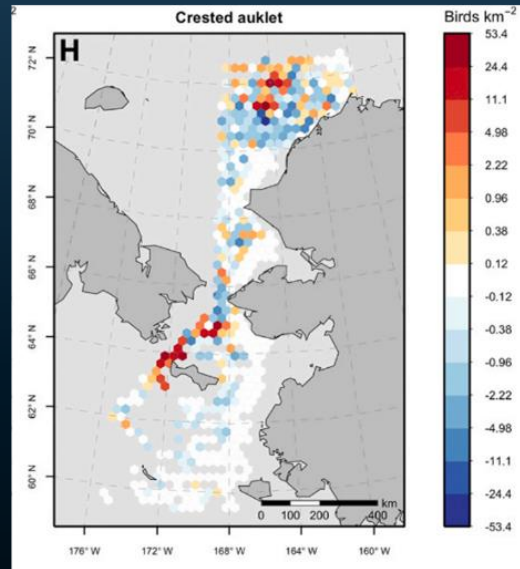
- Diet diversity declines
- Diets are more similar between auklet species

# Effect of heatwave on planktivores

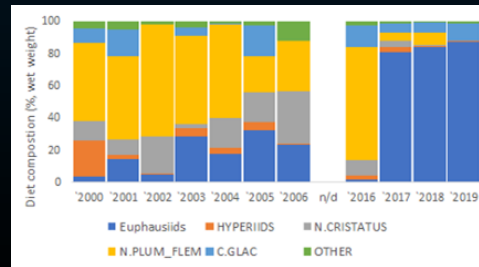
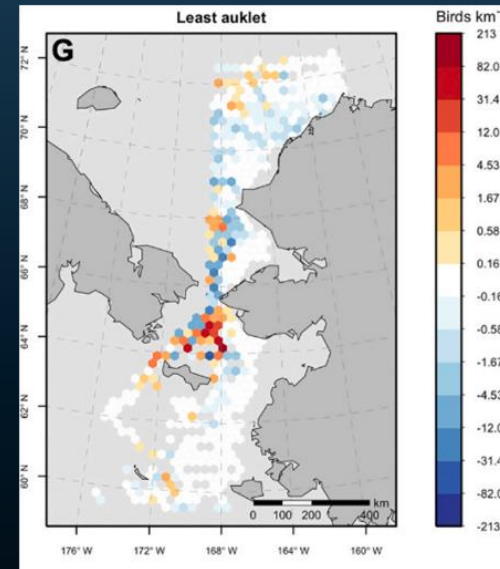
Copepods were back in 2022!



## Crested Auklets



## Least Auklets



# Seabird die-offs



- Alaska die-offs rare prior to 2015, now annual?
- Species at all trophic levels affected, some worse
  - Shearwaters in 2019 - SEBS
  - Thick-billed Murres in the Alaska Coastal Current 2018
  - Common Murres in GOA 2014/2015
- Public health concern for coastal communities





*B. Middleton*

## Population declines?

2016 – Common Murres disappeared from breeding colonies in the Bering Sea, 30%+ of breeding population lost?

2018 – Thick-billed murre die-off centered on St. Lawrence Island

St George and Hall Island auklet colonies have undergone major declines in the last decade

# Summary - Effects of the heatwave 2017–2019

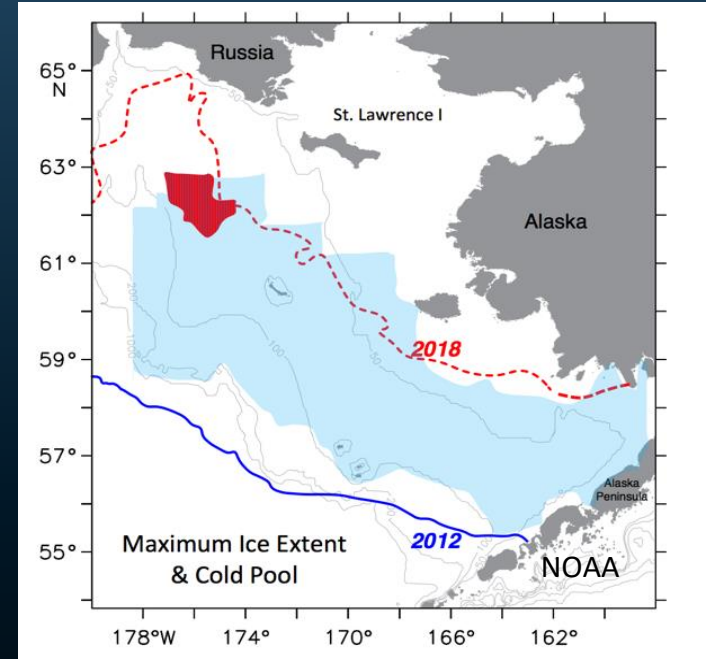
- Disruption of post-breeding movements
- Delayed, unsuccessful, and lack of breeding
- Changes in diet composition
- Widespread finding of beachcast birds
- Large reduction in breeding populations of murre

All related to changes in availability of prey?

# Relevance to fish

Changes in ocean temperatures and circulation are altering the...

- Distribution and composition of zooplankton in the northern Bering Sea
- Availability of forage fish
- Competition from piscivorous predators?



# Data needs

Include seabird observers on research vessels

Diet collections during non-breeding season

DNA bar-coding to make diet ID more efficient

Engagement with communities on St. Lawrence Island and Little Diomede to sustain monitoring activities

Support for monitoring at Cape Thomson

- low cliffs, better access to birds than Cape Lisburne
- time series starting in 1970s with a big gap 1995-2018
- accessed by boat only; nearest landing strip is 7 mi away
- ideally, camp mid-June to mid-August to get data on populations, productivity, and diet

